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SCIENCE

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PROBLEMS OF POPULATION OF THE NORTH PACIFIC AREA AS DEPENDENT UPON THE BIOLOGY, THE OCEANOGRAPHY, AND THE METEOROLOGY OF THE AREA¹

FOR long ages before written records began, human migrations seem to have taken place over the vast Pacific region. These apparently affected the islands of the south, those of the north, and those of the the middle portions, as likewise the continental littorals of Asia and North America. Later came the era, very recent as all human history goes, of the drifting of Chinese and Japanese fishing junks upon the northern American coast, and of castaway Japanese traders upon the Mexican coast. Following this came the truly modern era, ushered in, one may fairly say, by President Fillmore's appeal to the Emperor of Japan, through the Perry embassy, for the opening up of the Hermit Kingdom in the interest of American industrial and commercial development as represented by the whale fishery, and closely identified with gold mining in California. Shortly thereafter, followed the bringing of Chinese coolies for labor in building the Pacific end of the first transcontinental railroad.

Through all these, and many other events of similar import, on down to this very summer of 1919, when hardly a day passes in which the newspapers do not contain items of some sort involving the activities of Japanese or Chinese in the industrial and commercial life of Pacific North America, can be seen a contact of Asiatics and Americans—a kind of community of interests—made not only pos-

¹ The opening paper of a symposium on "The exploration of the North Pacific Ocean," held at the Pasadena meeting, Pacific Division, American Association for the Advancement of Science, June 19, 1919.

sible, but seemingly inevitable, by their common possession of the great ocean, and of the human propensities for adventure, travel and gain.

In another connection I have called attention to the variety of meanings which naturally attach to such phrases as "The Problem of the Pacific," "The New Pacific," etc.²

The wording of the topic, assigned to me in this symposium, when read in the light of the above reflections and along with the other topics of the program, suggests the direction my remarks should take. To the eyes of science, the situation as touching the peoples of the north Pacific area is this: Some 500,000,000 Asiatics are being brought into ever closer contact with some 6,000,000 Americans, the Asiatics being so placed geographically that scores of millions of them have about the lowest per capita allotment of any peoples on the earth of some of the primary material necessities of human life, while the Americans are so placed as to give them about the highest of such allotment.

That economic equilibrium will tend to establish itself between these two peoples is as certain as that two bodies of salt water of different density will tend to come to an equilibrium if in contact with each other.

There are two ways in which this equilibrating tendency may work itself out. (1) It may proceed in accordance with the brute instincts of self-preservation and self-realization. This is the way of material force working as modern commercialism and modern militarism. Frequently as the resemblance between these two gigantic forces has been noticed, it yet seems not to have been sufficiently brought home to many of us. (2) The other way in which the equilibrating tendency may realize itself is in accordance with the human reason for self-preservation and self-realization. This is the way of modern intelligence and rationality; in other words, of modern science.

Perhaps some one will question the warrant-

² "The Problem of the Pacific," Bull. No. 8, Scripps Institution for Biological Research, University of California, June 14, 1919.

ableness of including all the Chinese, Japanese and Koreans, as I did a moment ago, when speaking of Asiatic populations, while only the small portion of all North Americans are included which live on the Pacific slope. If question of this sort be raised, my reply is that being naturalists, we are bound to think in terms of nature—especially of geography—whenever we speak comprehensively of people; and hence must look at population in relation to the continental slopes, drainage areas, oceanic and fluvial waterways, etc., which constitute their major physical environments. The "North Pacific area" is clear enough of definition geographically viewed: It includes not merely the great north ocean itself, with its islands, but also those parts of the adjacent continents, Asia and North America, whose rivers flow into the ocean. In an important sense this is a unit area of population distribution as it is of physical geography.³

Pacific North America, as thus defined, seems to be as natural a depositing ground for immigrants from eastern Asia as Atlantic North America is for immigrants from Europe. While manifestly it would be easy to push such a criterion of unit area of peoples too far, yet recognition of it to the extent of its validity is of great practical importance.

The fundamental nature of the issue between Asiatics and Americans is clearly reflected in the character of the American legislative measures which have been proposed, and in some instances made into law, against the immigration of Asiatics.

That the issue is not primarily one of race

³ In *Fundamental Geological Problems of the North Pacific Ocean Region*, contributed to the symposium by George D. Louderback, occurs this: "The contrast between the geologic and geographic conditions of the eastern states and of the Pacific states of the United States is marked, and their geologic history is to a considerable extent unrelated, while there are striking similarities between the conditions obtaining along the eastern and western coasts of the North Pacific Ocean." This is interesting and may be significant taken in connection with my suggestion of a "unit area of population distribution."

is shown by the fact that the exclusion proposals are never aimed at Asiatics indiscriminately. Without exception, I think, the measures apply only to Asiatics upon whom the economic conditions of their native lands rest most heavily; those, namely, who live by the toil of their hands. The classes—public officials, persons of large affairs, professional men, and students—who enjoy considerable economic independence, are welcome in America, travel widely over the continent, and mingle freely and pleasantly with the citizens everywhere. Because of their approximate economic and cultural equality with those among whom they are, and because of the smallness of their number, these classes of Asiatics give rise to no perplexities, economic, racial or of any other kind.

The race element undoubtedly comes into the labor immigration problem with great force finally, but only as a consequence of economic conditions, and at the locus of greatest pressure of these conditions. Except for the economic element almost certainly there would be no problem of Asiatic immigration for the simple reason that there would be no such immigration.

The sole, or at least the chief motive of Asiatic laborers in coming to America is to improve their hard economic lot. And because of the restraint upon their travel which this hard lot imposes, they are bound to take advantage of the first chance which presents itself for accomplishing their aim.

No Chinaman who has barely money enough to pay the cheapest steamer passage across the Pacific, is going to the additional expense of a railroad journey to Kansas City or St. Louis for work if he can get as good wages in Seattle or San Francisco. And no Japanese farmer who crosses the Pacific under like conditions is going to the Mississippi valley to raise corn and wheat, if he can do better raising potatoes or berries or celery on the bottom lands of the Sacramento and Colorado rivers. Nor is any Chinaman or Japanese going to Lake Michigan or Cape Cod to fish if he can do as well fishing at Monterey or San Pedro. But these basal considerations

are not the sole, nor even the most important ones bearing on the case.

Not only is Pacific North America the natural depository for the semi-destitute peoples of eastern Asia who migrate to America, but as long as there exists an immense Asiatic population in such economic condition, and as long as there exist such alluring chances in Pacific America for relieving that condition, it is hardly possible that any device of politics or law or any gentlemanly arrangements will be able to permanently stay the movement for such betterment. The problems concern some of the most elemental and mighty forces of human nature—the forces which antedate and condition politics and law and gentlemanly conduct, as the tree with its roots antedates and conditions the tree with its blossoms and fruit.

During these very last weeks comes the report that 5,000 Asiatics came into the Pacific States of Mexico during March, 1919, and that the total immigration to that country last year was 100,000. And entrance into Pacific Mexico means an entrance into Pacific United States sooner or later. So subtle and pervasive and powerful are the forces which are impelling Asiatic immigration into America that exclusion treaties and laws and other mere contractual arrangements will be incapable of controlling them.

Am I not right in supposing it is the complexity and subtlety of these forces—economic in the sense of physical poverty affecting the great masses of Asiatics; racial as affecting these same portions of both Asiatics and Americans; and instinctive of self-preservation and self-realization of all the people of both continents—that makes the growing breach in the traditional friendships between the United States and Japan incomprehensible to the acutest observers of both countries? "I do not know how to account for it," frankly and almost despairingly declares Baron Shibusawa, one of the oldest and most intelligent of Japan's business students of America. And the replies which he records having received from distinguished Americans to whom he appealed for light, shows that

they are really as much in the dark as he is. One of these Americans, he tells us, assured him, that "the little cloud overhanging the sky will soon pass away."

Terrible, I warn both America and Asia, will prove the illusion if it goes uncorrected, that the ill-will growing between these two old-time friends is only a little cloud that will soon pass away!

But is the gigantic tornado which impends, to be regarded as a fate—as a thing in the hands of a purpose and a power wholly unapproachable, unmodifiable by man? No and ten times no; is my answer. We can convert the devastating tornado into a benign and fructifying wind-and-rain if we so resolve and act according to our resolution.

To point a way, and I am quite sure the only way, toward such resolution and such action is the central aim of my part in this symposium.

My first move in this shall be to remind ourselves that, as a few observers of anti-Asiatic "agitation," often so-called, of the Pacific states have remarked, this agitation is at bottom an expression of the instinct of self-preservation. This remark I wish to supplement by affirming that not only is the instinct of self-preservation on the part of the American agitators involved, but likewise there is involved not merely the same instinct of the Asiatics, but also the instinct of self-realization of both Asiatics and Americans. And I remark that he errs grievously whose observation on instincts has not recognized the difference between the instinct of self-preservation and that of self-realization.

But the point which I wish particularly to fix attention upon in the remarks just made is that the problem as it is actually presenting itself to us, lies chiefly in the domain of human instinct and passion; and that this is only another way of saying that it does not lie chiefly in the domain of human reason.

The quintessence of the proposal I am going to make is that the problem shall be so shifted in its locus that instead of lying primarily in the domain of instinct and only secondarily in that of reason, it shall lie pri-

marily in the domain of reason, of intelligent life and action, and only secondarily in the domain of instinct, of instinctive life and action. And may I not believe that at least in the group of men and women here assembled, scientific as we all are, this proposal shall not be received with listless toleration, as a mere academic pronouncement?

In the interest of grounding my proposal a little more securely on fundamental principle, I remind you of the familiar characterization of all instincts as "blind." And note the unerring truthfulness of our common modes of expression: The "instinct of" self-preservation and of self-realization, we say: The instinct of existence is in the very essence of existence itself. Not so with reason. The "reason for" we automatically say, self-preservation and self-realization. Existence must justify itself, according to reason. Furthermore, reason must concern itself with the modes and means of existence.

My proposal that the problem of the peoples of the Pacific area shall be carried up so that its larger moiety may lie in the domain of reason instead of in the domain of instinct, means that the Chinese and Japanese and Koreans and Siberians and British Columbians and United Statesans and Mexicans shall take much thought about their self-preservation and self-realization—about why they should be preserved and why they should realize their desires and ambitions; and about the manner in which they should exist and the means by which this may be and ought to be accomplished.

It means, in other words, that the problem should be one of science at its fullest and best; science as the great body of observational and reflective truth concerning external, or material nature, and science as the great body of observational and reflective truth concerning the internal, or spiritual nature of man. And this means economic and cultural justice and morality, international as well as national.

A cardinal aim of all effort in accordance with the principles here indicated, would be to remove the one great inducement to Asiatic

migration to America, namely, the grinding poverty under which the great masses of hand laborers of Asia live at home. Surely it would be disastrous to both western America and eastern Asia as wholes, for the former to become Asiaticized to the extent that the Hawaiian Islands have become so. But the only rational way and, as I believe, the most effective and practical way to prevent this is to make the economic conditions of Asiatic laborers in Asia at least approximately as favorable to them as are the conditions which they find in America.

If statesmanship pronounces this an utterly unrealizable ideal, it thereby merely declares its own incompetency to bring it about, this incompetency being due to the fact that statesmanship of the traditional sort is not primarily a thing of comprehensive, accurate knowledge and reason, but rather only of partial knowledge and of instinct and impulse. And this raises the question, very pertinent at this time: What has been in general the fundamental nature of political motive and action, especially as between nations, down to this time? Has it been mainly rational and intelligent, or has it been mainly instinctive and passionate? Let history answer.

In the cataclysmic condition of the world to-day, three occurrences in particular are recognizable which should encourage the attempt to deal with the Asiatic-American problem on the principles I am setting forth. (1) The revised covenant for the League of Nations (which will surely soon be adopted if reason is indeed now to be enthroned in the government of the world), making the League the central body for coordinating and promoting international activities generally; (2) the provisions of the covenant relating to labor problems which are international in scope; (3) the determination by the American Federation of Labor at the Atlantic City convention (according to press dispatches) to cooperate with Japanese workers for bringing about a better understanding between working men of Japan and the United States.

I venture to predict that were the agencies

and movements here indicated to become really active in behalf of the Asiatic-American problem, they would inevitably move in the direction of some such solution of it as I am indicating.

A thing that science can say which ought to contribute much as an initial step in this direction is that the civilized world may assure itself that given adequate scientific investigation and utilization of the resources of nature; and given a due measure of scientific knowledge and of the spirit of justice and morality in politics and law in national and international affairs; and given, further, a due sway of reason in the growth of population, and no people of the world need live in danger of starvation or even of serious want. The proposition is surely susceptible of something approaching demonstration that the dogma of the inevitability of material poverty for great sections of the world's population is a mark of primitiveness, of immaturity of human societies.

And I wish here to affirm the unhumanness of national policies which encourage large families in the interest of large armies and cheap labor.

Probably the foremost significance of reason in the human animal is that it is the device or agency developed by nature to relieve the species from the uncertainty and precariousness of material sustenance as instinct alone is able to secure it.

To develop the latent natural resources of the whole Pacific area, of land and water alike, and then to distribute and use the fruits obtained in such fashion that all portions of all the populations shall be beneficiaries in just ratio, would be exactly one of the most characteristic things which these peoples could do as rational, *i. e.*, as truly human animals.

This paper and those to follow in this symposium are so many indices of what would be involved in carrying out such a proposal so far as the great ocean itself is concerned.

Many decades of common experience with, and scientific research upon the oceans of the earth, the atmosphere which overspreads them,

and the life which teems in their waters, have yielded large knowledge. Much of this knowledge is revelatory of great riches in living beings useful to man. And revelatory, too, is the knowledge of how intimately the life and health and happiness of men are dependent upon the oceans themselves because of certain of their physical and chemical attributes; and upon the atmosphere which is a sort of vital nexus between sea and land.

But the knowledge thus far obtained as to these beneficences is hardly more than an outline the details of which are yet to be filled in.

The papers which are to follow will present portions of the sketch more clearly, and will indicate in some particularity what filling in of details would probably show, and the means by which the task would have to be done.

Far more knowledge is essential as to what useful organic resources the waters contain; as to how these may be utilized; and as to how they may be made permanent as well as useful.

Greater knowledge of the ocean itself and the atmosphere must be had in order that the harvesting and the conserving of its resources may be more certain and safer; in order that all travel upon the sea may be facilitated; and in order that those aspects of the land's productiveness which are largely influenced by the conditions of the sea may be brought more under the control of man.

Knowledge, and ever more knowledge, is the watchword in this aspect of the great problem: and of such nature and so broad is the requirement that it is well nigh indispensable that all the peoples whose interests are involved should participate in securing it. Common needs of world-population demand common world scientific research and world effort in affairs.

And now, taking this very meager statement as a foundation to go on, I venture to summarize, in the name of world science and the spirit of it, what the problem of peoples of the Pacific area is, and by what methods it could be resolved. It is a problem in which the two elements of economics and race are so enormously potent that little wonder need

attach to the fact that many students anxiously observing the animosity growing up between Japan and the United States particularly, conceive that the problem is wholly either the one or the other, or at most both of these elements. But not so. It is a problem of the whole gamut of human nature as this manifests itself in two great groups of highly and equally, though diversely civilized peoples of different though equal races, coming into economic conflict with each other.

And just because the two groups stand high and essentially equal in civilization; and just because each is within itself, predominantly guided by rational knowledge and conduct, the only possible real solution of the conflict between them must be likewise through rational knowledge and conduct. It is then heavily incumbent upon those men and women in both groups who are professed and acknowledged leaders in the life of the intellect, not only to bring home to our fellows what is involved in this way of solving the problem, but also to bring home to them what would almost certainly result from leaving the problem where it now is, namely predominantly in the realm of instinct and passion. This last means that our duty is to proclaim the indubitable fact that the counterpart of the instinct of self-preservation throughout the whole animal creation is the fighting instinct; and that consequently fighting—war—will be an almost certain consequence of leaving the problem where it is, this implying an almost certain irrational, unjust, and destructive treatment of the problem.

And upon those of our fellows, the numbers of whom are, unfortunately, neither few nor powerless, who oppose the rule of reason in such matters, and favor the rule of instinct, let us not fail to impress the lesson of Germany at this hour, as an example of the doom that awaits any modern nation whose international conduct is based more on instinct and brute force than on reason and moral force.

"All that take the sword shall perish with the sword." The profound natural truth which comes to expression in this familiar

phrase, has never been more terrible exemplified than by Germany, yesterday wielding her vast might of intellect and muscle to dominate the world; to-day cast down to the very dust and utterly impotent.

Nature herself, working through the process we have named evolution, has produced an agency, the human reason and intelligence, one of the main purposes of which is to find a better way, *i. e.*, a more efficacious, more certain, and less destructive way than war for solving problems of human preservation and realization.

WM. E. RITTER

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SOME NECESSARY STEPS IN ANY ATTEMPT TO PROVE INSECT TRANSMISSION OR CAUSA- TION OF DISEASE

THE study of the causation of disease is attracting far more attention to-day than it ever has in the past, but it is to be regretted that there is not a larger proportion of this effort being directed toward locating the possible intermediate hosts and invertebrate carriers.

Many excellent investigations have been carried out with all other phases complete, but the question of invertebrate carriers is often left in a very indeterminate stage. The majority of the investigations which have been seriously undertaken to determine invertebrate carriers have been conducted on other continents than ours. There is a great field for investigation along these lines open to investigators in America. In order to stimulate such research, I have attempted in this paper to set down some of the necessary steps for successful investigation.

I. COOPERATION

I consider essential to a thorough investigation of disease transmission, the establishment of a perfect working agreement and hearty cooperation between one or more physicians and diagnosticians, one or more parasitologists, and one or more entomologists. It is not safe nor does the effort bring the proper

amount of credence, when one man attempts to do the whole work. Each phase of such an investigation should be handled by an expert on that phase. The day of the solitary investigator is past and we are now in an era of group-investigations which carry with them weight and conviction. Of course certain preliminary steps may easily be taken by any one member of a proposed group or it may be possible that they may arrive at an advanced stage by independent work, but the time will come in each investigation when a cooperation of investigators will attain the most satisfactory results.

II. WHERE SHOULD THE INVESTIGATIONS OF INSECT TRANSMISSION BEGIN?

There are two distinct lines of approach to this problem of insect transmission. The first is to work from the known disease and to ascertain by experimentation what species of insects might be concerned in its transmission. The other line of approach is to make a study of all the insects which might be involved in disease transmission and to obtain, by cultures and microscopic studies, a knowledge of the parasitic organisms normally and occasionally found in these insects. Working on this line of investigation, one might in time of an epidemic start with insects visiting excreta and attempt to ascertain whether the organism of the disease at that time epidemic occurs in any of these insects.

The first line of investigations would rise from public necessity and probably be initiated by physicians and parasitologists, or by the suggestion of entomologists.

The second line of investigations would probably originate as problems assigned by a professor or head of a laboratory to students or investigators under his direction. It is highly desirable that such studies be commenced in as many institutions as practicable in the near future. Such investigations will include bacteriological studies, protozoological studies and helminthological studies, as well as investigations of the life histories of the insects, and the possible connection between them and disease transmission.